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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,176	09/24/2003	Tatsunhide Tsuyuki	Q77300	4041

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SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
HUNG, YUBIN	
ART UNIT	PAPER NUMBER
2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/668,176	TSUYUKI ET AL.	
	Examiner	Art Unit	
	Yubin Hung	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/24/03*.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *20070117*.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Claims 4 and 6 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

2. Specifically, claim 4, which depends from claim 3, recites the following additional limitation:

- **the processing unit performs a process of reducing the difference** *(between the superposed noise components)*

However, claim 3 inherits the following limitation

- **wherein a processing unit which...performs a process of reducing a difference** (other than a geometric difference between image structures corresponding to the parallax of both eyes)

from claim 1 and further recites that the difference to be reduced is a difference *between noise components superposed* on the pair of images. Therefore claim 4 does not further limit claim 3.

3. Specifically, claim 6, which depends from claim 5, recites the following additional limitation:

- **Wherein the processing unit performs a process of reducing the difference** *(between the colors)*

However, claim 5 inherits the following limitation

- **a processing unit which...performs a process of reducing a difference** (other than a geometric difference between image structures corresponding to the parallax of both eyes)

from claim 1 and further recites that the difference to be reduced is a difference *between colors* in the pair of images. Therefore claim 6 does not further limit claim 5.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), ANNEX IV, partially reads as follows:

First paragraph

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structure and computer programs which impart functionality when employed as a computer component. ...

Second paragraph

> Both types of "descriptive material" are nonstatutory when claimed as descriptive material per se. ...

Section (a), second paragraph, beginning at line 7

> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowery, 32 F.3d at 1583-84, 32 USPQ2d at 1035. ...

5. Claim 14 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 14 recites *a storage medium* which stores a *program*. Since the program is not necessarily a computer program and the medium is not necessarily a computer-readable medium, the invention of claim 14 is not statutory subject matter.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the phrase "so that a noise...between the image structures" in the last three lines is not complete and therefore the mete and bound of the claim cannot be ascertained. [Note: Per a phone interview with applicant's representative Ms. Susan Pan on 01/18/07, for examination purpose "is determined" will be appended to the end of claim 10.]

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claim 1, 2, 5-8 and 12-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Matsui et al. (US 2003/0128273).

10. Regarding claim 1, and similarly claim 13, Matsui discloses an image processing apparatus [Fig. 16, ref. 1-8; P. 6, paragraph 123] comprising a processing unit [Fig. 16,

ref. 1-9; P. 6, paragraph 123] which, in a pair of images formed to generate a difference corresponding to a parallax of both eyes [Fig. 17A, refs. 2-4 & 2-5; Fig. 17B, refs. 2-7 and 2-8; P. 5, paragraph 115, lines 5-6 (indicating that the images are for the left and the right eyes and therefore are according to the parallax of both eyes)], performs a process of reducing a difference other than a geometric difference between image structures corresponding to the parallax of both eyes [Fig. 17B, refs. 2-7 through 2-10 and Fig. 18, ref. S304 (lightness correction); P. 7, paragraph 139, lines 15-23; note that by making the intensity of corresponding portions similar, the intensity difference, which is not geometric, is reduced].

11. Regarding claim 2, Matsui further discloses that the pair of images is still images from a pair of video images [Fig. 16, refs. 1-1 & 1-4 and Fig. 17A, refs. 2-1 & 2-2 (capturing stereo video images); Fig. 17A, refs. 2-3 & 2-4 (still stereo image pair); P. 6, paragraphs 118, 127 and 128] formed to generate a difference corresponding to a parallax of both eyes [P. 5, paragraph 115, lines 5-6 (indicating that the images are for the left and the right eyes and therefore are according to the parallax of both eyes); note that a stereo pair of images inherently has a difference corresponding to a parallax].

12. Regarding claim 5, and similarly claim 6, Matsui further discloses that the non-geometric difference is a color difference [P. 8, paragraph 157].

13. Regarding claim 7, Matsui further discloses

- a recognition unit which recognizes the geometric difference between image structures corresponding to the parallax of both eyes in the pair of images
[Fig. 16, ref. 1-9; Fig. 18, ref. S303 (the largest cross correlation indicates the geometric difference). Note that per P. 6, paragraph 123, the CPU 1-9 executes applications and since it is the only unit capable of doing so (among the components of the apparatus 1-8), the application as the one specified in S303 of Fig. 18 necessarily has to be executed by the CPU and therefore it also serves as the recognition unit]
- wherein the processing unit performs a process of reducing a difference other than the geometric difference between the image structures recognized by the recognition unit in the pair of images
[Per the analysis of claim 1; see especially Fig. 18, refs. S303 and S304]

14. Regarding claim 8, Matsui further discloses that the geometric difference is recognized by performing matching [Fig. 18, ref. S303, note that cross correlation is a form of matching].

15. Regarding claim 12, Matsui further discloses obtaining the pair of images of the same scene by using (1) more than one *or* (2) only one image pickup device [Fig. 16, refs. 1-1 & 1-4; Fig. 17A, refs. 2-1 & 2-2 (using two devices); P. 5, paragraph 115, lines 5-6 (indicating that the images are for the left and the right eyes and therefore are according to the parallax of both eyes)]

16. Claim 14, which is the corresponding medium claim of claims 1 (apparatus) and 13 (method), is rejected because per the analysis of claims 1 and 13 Matsui discloses the difference reduction process recited in the claim 14 and further discloses a storage medium for storing applications [Fig. 16, ref. 1-10 and P. 6, paragraph 123; see also P. 11, claim 32].

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

18. Claims 3, 4, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui et al. (US 2003/0128273) as applied to claims 1, 2, 5-8 and 12-14, above, and further in view of Onda (US 5,719,954).

19. Regarding claim 3, and similarly claim 4, Matsui discloses all limitations of its parent, claim 1.

Matsui does not expressly disclose that the other difference is a difference between noise components superposed on the pair of images. However, Onda discloses removing noise on the images of a stereo pair by smoothing [Fig. 3, refs. S3 & S4 (these steps include smoothing); Fig. 5A, ref. S7 (smoothing); note that per Col. 4, lines 64-67 and Col. 5, lines 33-34, smoothing removes noise components from each image, therefore the difference of the noise components superposed on the image pair is reduced].

Matsui and Onda are combinable because they both have aspects that are from the same field of endeavor of stereoscopy.

At the time of the invention it would have been obvious to one of ordinary skill in the art to modify Matsui with the teachings of Onda by reducing the noise difference (by smoothing each image of the pair). The motivation would have been to absorb errors which may occur in stereo [Col. 3, lines 3-5; note that noise can cause mismatches (by giving rise to false edges) and results in errors].

Therefore it would have been obvious to combine Onda with Mitsui to obtain the invention as specified in claim 3.

20. Regarding claim 9, Matsui further discloses that the processing unit performs, as the process of reducing the difference other than the geometric difference between the image structures

- at least one of a process of removing a noise component superposed on only one of the pair of images from the one image or a process of correcting at least one of the pair of images to eliminate or reduce a difference between noise components which are different from each other and superposed on corresponding regions on the pair of images [Matsui: Fig. 18, ref. S304; P. 7, paragraph 139, lines 18-23 (correction applied to one or both images). Note that Onda has already disclosed that the difference to be reduced is the noise component difference.]

21. Regarding claim 11, Onda further discloses

- wherein the processing unit averages the noise components which are different from each other and superposed on the corresponding regions on the pair of images, and corrects at least one of the pair of images based on the averaged noise component
[Col. 4, line 66-Col. 5, line 5 (weighted averaging, which is a form of averaging). Note that in smoothing operation (which is a form of correction) a pixel's value is replaced by the (weighted) average of the values (noise included) of the pixels in a window centered at that pixel; therefore the correction is based on the averaged noise component. Further, per the analysis of claim 9 above, smoothing (i.e., correction) can be performed on either one or both of the images]

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22. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui et al. (US 2003/0128273) as applied to claims 1, 2, 5-8 and 12-14 above, and further in view of Aucsmith et al. (US 6,873,723) and Onda (US 5,719,954).

23. Regarding claim 10, Matsui discloses all limitations of its parent, claim 7.

The combined invention of Matsui does not expressly, but Aucsmith does, disclose that the processing unit

- divides the pair of images into sectional regions
[Fig. 5 (regions); Fig. 7, ref. 720 (dividing); Col. 5,line 62-Col.6, line 10; Col. 6, lines 62-64]
- determines a sectional region of the other image corresponding to a specific sectional region in the one image based on the geometric difference between image structures in the pair of images recognized by the recognition unit
[Fig. 7, ref. 730 (matching, i.e., determining corresponding region) Col. 6, line 64-Col. 7, line 2]

Matsui and Aucsmith are combinable because they all have aspects that are from the same field of endeavor of stereoscopy.

At the time of the invention it would have been obvious to one of ordinary skill in the art to modify Matsui with the teachings of Aucsmith by dividing the images into regions and determining correspondence between regions from different images. The motivation would have been to establish the correspondence between the left and the right images so the depth of regions can be computed [Aucsmith: Col. 4, lines 10-13] and that the foreground and background can be separated [Aucsmith: Col. 1, lines 21-35].

24. Regarding the last limitation of claim 10

- compares the sectional regions determined to be corresponding regions with each other for the respective sectional regions, so that a noise component which causes the difference other than the geometric difference between the image structures

Note that Matsui further discloses that to reduce a difference (e.g., lightness), the component (i.e., the correction amount) that causes that difference is first determined by comparing the corresponding regions [Fig. 18, ref. S304 and P. 7, paragraph 139, lines 15-23].

The combined invention of Matsui and Aucsmith does not expressly disclose that the component to be determined is a noise component.

However, Onda teaches that it is desirable to reduce the difference between noise component [Fig. 3, refs. S3 & S4 (these steps include smoothing); Fig. 5A, ref. S7 (smoothing); note that per Col. 4, lines 64-67 and Col. 5, lines 33-34, smoothing

removes noise components from each image, therefore the difference of the noise components superposed on the image pair is reduced].

The combined invention of Matsui and Aucsmith is combinable with Onda because they both have aspects that are from the same field of endeavor of stereoscopy.

At the time of the invention it would have been obvious to one of ordinary skill in the art to modify the combined invention of Matsui and Aucsmith with the teachings of Onda by having noise as the component of which the difference should be determined and reduced. The motivation would have been to absorb errors which may occur in stereo [Col. 3, lines 3-5; note that noise can cause mismatches (by giving rise to false edges) and results in errors].

Therefore it would have been obvious to combine Onda with Mitsui and Aucsmith to obtain the invention as specified in claim 10.

Conclusion and Contact Information

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

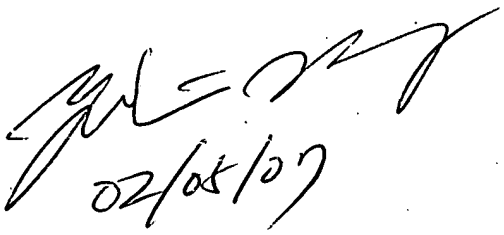
- Berestov (US 6,862,364) – discloses adjusting intensity of corresponding regions in a stereo pair

- Brumage *US 4,709,263) – discloses a stereoscopic apparatus that compensates for chromatic aberration
- Melen (US 6,674,892) – discloses a method for correcting an epipolar axis for skew and offset that divides images vertically and matches blocks in each vertical segment
- Tomita et al. (US 5,202,928) – discloses determining corresponding segments in segmented stereo pairs
- Koizumi et al. (US 5,113,137) – discloses using stereo matching to identify and reduce noise

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (571) 272-7451. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew C. Bella can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Yubin Hung
Patent Examiner
Art Unit 2624
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